FAA ALASKAN REGION

Capstone

Investment in Safety

The *Capstone* Program is a joint industry and FAA Alaskan Region effort to improve aviation safety and efficiency by putting cost effective, new technology avionics equipment into aircraft and providing the supporting ground infrastructure. The demonstration areas are non-radar environments where most of the air carrier operations have been limited to Visual Flight Rules. *Capstone* is equipping aircraft used by commercial operators in the area with a government-furnished Global Positioning System (GPS) based avionics package. In addition to the avionics suites, *Capstone* is deploying equipment for weather observation, data link communications, surveillance, and Flight Information Services (FIS). *Capstone* has also increased the number of airports served by an instrument approach and now enables radar-like IFR air traffic control services. A significant number of mid-air collisions, controlled flight into terrain, and weather-related accidents can be avoided with new technologies incorporated into the *Capstone* avionics package.

Phase II of *Capstone* will move to Southeast Alaska, a more environmentally challenged area of the state. As with the Phase I in the Yukon-Kuskokwim delta, Capstone plans to equip aircraft used by commercial operators and deploy a ground system that will support a usable IFR infrastructure and improve communications.

In addition to enhanced safety and new operational capabilities, the *Capstone* program is providing real world information and experience that is essential for modernization of the National Airspace System.

Highlights

- The Capstone Program provides weather, (text and graphics) directly to the pilot in the cockpit.
- Installation of new automated weather systems enables commercial operators to perform GPS approaches at airports in the Yukon-Kuskokwim area.
- GPS non-precision instrument approach procedures have been completed and published for 10 additional remote village airports within the Yukon-Kuskokwim area.
- Introduction of a modern data link network allowing participating pilots to see aircraft traffic via a cockpit display to aid in collision avoidance.
- An interface with the existing radar tracking system provides radar like services to participating aircraft in the Yukon-Kuskokwim delta region. Future enhancements will allow pilots of Capstone-equipped aircraft to see Automatic Dependent Surveillance-Broadcast (ADS-B) *and radar* targets via Traffic Information Service-Broadcast (TIS-B), for all nearby aircraft.
- The University of Alaska at Anchorage is conducting training for Capstone participants and is performing an in-depth safety study and assessment of the Capstone program.
- Aircraft selected for the Capstone Program receive:
  - An IFR-certified GPS navigation receiver.
  - ADS-B Transmitter/Receiver.
  - A multi-function color display with traffic/terrain advisories.
  - TIS-B providing radar traffic information.
  - Terrain Database.
  - Flight information data depicting airports and related flight safety information.

Technical Information

HARDWARE

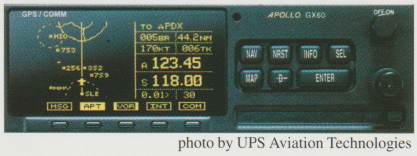
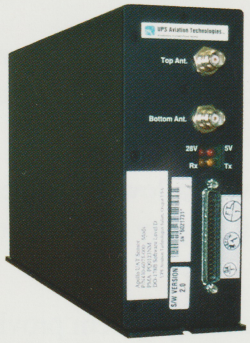


photo by UPS Aviation Technologies

GPS - The Apollo GX60 navigation system is a non-precision, IFR approach certified GPS receiver meeting the requirements of TSO-C129A Class A1. The unit features an 8 channel GPS receiver and an 8 watt, 760 channel, VHF Communications unit.

photo by UPS Aviation Technologies

MFD - The daylight visable, multifunction MX-20 display features a 6" display screen and supports over 65,000 colors with a 640x480 resolution. It contains a Pentium processor for integrating ADS-B, GPS, terrain, weather graphics, and IFR database information. The MFD provides enhanced situational awareness with moving maps depicting terrain, traffic, and weather information.



UAT - The **U**niversal **A**ccess **T**ransceiver is a transmitter/receiver combination that communicates the datalink information for the ADS-B data air-to-air between aircraft, as well as the TIS-B, and FIS services between the aircraft and the ground stations. The 50watt UHF transmitter reports the aircraft data at 1 second intervals.

FUNCTIONS

ADS-B - Automatic Dependent Surveillance-Broadcast is a function that broadcasts position, altitude, vector and other information for use by other aircraft, vehicles, and by ground facilities. ADS-B supports improved use of airspace, improved surface surveillance, and enhanced safety (such as conflict management) for users.

FIS - Flight Information Services function allows an aircraft to receive current and forecasted weather and weather-related information as well at the status of Special Use Airspace (SUA). The enhanced weather products will be available to the pilots and controllers allowing them to share the same situational awareness. This information will be displayed either in text or graphical form, as selected by the pilot.

TIS-B - Traffic Information System - Broadcast function will provide the capability to determine aircraft position using radar and to broadcast this position information to airborne aircraft that are ADS-B equipped.

Terrain Awareness - The terrain information is depicted relative to the aircraft's position so that the relative bearing and distance may be determined. A flashing terrain advisory flag is displayed whenever the aircraft is within 500 verticle feet of the terrain, or when the aircraft is within two minutes, horizontally, of terrain.

For more information visit the *Capstone* website at: www.alaska.faa.gov/capstone

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